THE VETERINARY RECORD

FOUNDED BY WILLIAM HUNTING, F.R.C.V.S., 1888

No. 34. AUGUST 21, 1948 VOL. 60.

Fungous Diseases of Animals in Britain

By

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In 1832, Richard Owen, when dissecting a flamingo, "was much struck with finding the inner surface of the (lungs) and that of the smaller ramifications of the bronchial tubes, covered with a green vegetable mould or *mucor*." "As the individual was examined within 24 hours after death," he continued, "it seems reasonable to conclude that this mucor had grown during the life-time of the animal. Thus it would appear that internal parasites are not exclusively derived from the animal kingdom." These observations, which probably constitute the first record of aspergillosis for this country, are among the earliest made on the association of fungi with disease in animals. It was not until five years later that the Italian, Bassi, offered experimental proof that the Muscardine disease of silkworms was a contagious infection caused by a fungus (later named in his honour *Beauveria bassiana*) and four more years elapsed before fungi causing ringworm in man were described. In the years which followed there was much speculation as to the role of fungi as disease-producing agents until the classical researches of Pasteur, Koch and Lister demonstrated the paramount importance of bacteria as pathogens of man and animals. The stimulus given by the discoveries of Sabouraud during the closing years of the century brought about a temporary revival of interest in pathogenic fungi and interest in these forms has been increasing again during the last two decades, particularly in North and South America. In this country, as until recently elsewhere, there has been an almost complete divorce of veterinary and medical men interested in mycology from the workers on plant pathogenic fungi, some of whom, being primarily botanists, have usually been leading mycologists of the day. This has been detrimental to both aspects of mycology. General mycologists have neglected the study of fungi pathogenic for animals and the student of mycotic diseases of animals has created much unnecessary confusion by being unaware of the developments in other branches of mycology.

MYCOSES OF ANIMALS IN BRITAIN

Of the mycotic diseases affecting animals in this country only one, epizootic lymphangitis of horses caused by *Cryptococcus farciminosus*, has had the distinction of legal recognition. This disease, which is common in many other parts of the world, was introduced into the British Isles after the Boer War but prompt action resulted in its eradication. No cases have been reported during recent years although it is still scheduled under the Diseases of Animals Acts. Aspergillosis of poultry and other birds in captivity has a country-wide distribution and regularly causes not inconsiderable losses. Actinomycosis in cattle and other animals is well-known but there are few modern records. As in man, ringworm diseases are probably the commonest mycoses affecting higher animals. Cats, dogs, horses and cattle are frequently attacked but little effort is made to control these complaints. Favus in fowls is now less common than at one time when it was the subject of one of the Ministry of Agriculture's leaflets (first issued in 1901). In addition to salmon disease of freshwater fish caused by species of *Saprolegnia*, which is at times troublesome, there are a number of records of abnormalities in animals caused by fungi or associated with fungi whose significance is uncertain. Other mycotic diseases of animals are probably still unrecognised. A few cases of histoplasmosis in man (caused by *Histoplasma capsulatum*) have been diagnosed in this country during the past six years. In the United States this disease has also been noted in dogs and in one instance the dog had recently been imported from England where it may have contracted the disease.

IDENTITY OF THE PATHOGENS

Shortly before the recent war the British Mycological Society organised the taking of a census of fungi recorded for this country. Several sections of this catalogue have already appeared and a list of the fungi pathogenic for man and higher animals has now been completed for publication in the *Transactions* of that Society. The preparation of this list has emphasised the uncertainty which prevails as to the identity of the pathogens responsible for some of even the commoner mycoses affecting animals. For example, actinomycosis in man and cattle is usually regarded as being caused by one organism. The only modern British study of the causal agents of actinomycosis is that by Erikson* who concluded that the strains affecting man and cattle were specifically distinct. Unfortunately Erikson was only able to compare human isolates from this country with cattle isolates from Australia so that further investigation is needed. Salmon disease in Britain is attributed to *Saprolegnia ferax* but Coker working in the United States regards the pathogen responsible for the disease of fish and fish eggs as a distinct species for which he has proposed the name *S. parasitica*. Investigation is again required. The ringworm diseases affecting cattle and other animals in this country appear never to have been carefully studied. That cattle, horses, cats, dogs and laboratory animals such as mice are frequently attacked by ringworm is well known, as is the fact that men, women and children frequently contract ringworm by contact with infected animals. It is commonly by the isolation of fungi from such cases in man that the identity of the fungi affecting animals is inferred. It is symptomatic of the state of affairs in the veterinary field that the illustrations to the section on ringworm in the standard British textbook on veterinary pathology and bacteriology are, as is admitted, of exclusively human types of ringworm fungi. Also, it is frequently categorically stated that dermatophytes which are believed to confine their attentions to man occur in various domestic animals.

NAMES OF THE FUNGI

The fungi pathogenic for man and animals have been given many names. It is customary for authors to choose the scientific names for the pathogens in which they are interested according to their particular preferences rather than by reference to the international agreements on the selection and use of names. This leads to lack of uniformity and frequently to serious misunderstanding.

Although much yet remains to be done, the classification of fungi as a group is more firmly established than that of the bacteria and during recent years mycologists have come to appreciate the advantages which accrue from the use of names which conform to the International Rules of Botanical Nomenclature. Since 1935 the application of names of fungi is governed by the type method; that is to say, a name must always be used so as to include the sense employed by the author of the name. When more than one name has been given to any species then the earliest name must be adopted. One of the duties of systematists is to examine the type specimens or the original descriptions accompanying the proposals for new names and to ascertain what is the internationally acceptable name for an organism when classified in any particular group. For example, the cat and dog ringworm fungus, or, more precisely, the fungus causing microsporosis in cats and dogs is to-day called *Microsporum canis*, *M. felineum* and *M. lanosum* by different authors, or by the same author on different occasions. Systematists are generally agreed that these three names have been applied to one species. That being so, the name for this species under the International Rules is *Microsporum canis*, the oldest of the three names. If an author chooses one of the other names, say *M. felineum* which might be considered more appropriate for the cat ringworm fungus, he is quite at liberty to do so but he cannot expect others to use this name without producing convincing evidence that the fungus described in November 1902 by Mewborne in New York as *M. felineum* was different from the one described earlier in the same year by Bodin in France as *M. canis*.

The cause of actinomycosis in both man and cattle is often called *Actinomyces bovis* Harz but in the opinion of competent systematists the description given by Harz does not indicate whether this name should be applied to the organism causing actinomycosis or actinobacillosis. This is one reason for the adoption of *Actinomyces israeli* for the anaerobic actinomycete which causes actinomycosis in man. If Erikson's findings are correct, the organism causing actinomycosis in cattle is still without a name.

* *Medical Research Council, Special Report Series*, No. 240, 1940.

Disease Names

Another cause of confusion is in the use of disease names. Most plant pathogenic fungi give rise to specific diseases in particular plants (*e.g.*, *Phytophthora infestans* causes potato blight) so that the meaning of a disease name is precise even when the causal organism is not mentioned. With most mycotic diseases of man and animals it is otherwise. Disease names such as ringworm (or the narrower microsporosis or trichophytosis) even when qualified by the name of the host or the part affected (*e.g.*, cattle ringworm, head ringworm in man) cover conditions caused by several distinct fungi. Some disease names, such as mouse favus (*Trichophyton quinckeanum*) are, however, specific. Aspergillosis in birds (*Aspergillus fumigatus* and only occasionally by other species of *Aspergillus*), is nearly so and it is convenient to restrict the meaning of certain other names, *e.g.*, actinomycosis for the disease caused by anaerobic actinomycetes of the *Actinomyces israeli* group (diseases caused by aerobic actinomycetes are more properly called nocardioses), and calf ringworm for the disease caused by *Trichophyton discoides*, but in any publication or report the pathogen involved should always be indicated.

Some of the causes of confusion in veterinary mycology should now be apparent. The state of fungus classification is such that it will be long before permanent names can be assigned to all pathogens—and it should be remembered that the systematic mycologist desires stability and uniformity in the use of names in spite of his sometimes apparently capricious changes in familiar names. In the meantime a conservative attitude to classification and a considered application of the provisions of the International Rules of Nomenclature tend to minimise name changes and make for uniformity in usage. There is already an extensive, if confused, literature on veterinary mycology. It is only the correct identification of the pathogen involved which enables the research worker or the practitioner to find information obtained by others which may have a bearing on his particular problem. Also, clinical observation or experiment loses much of its value if the identity of the pathogen is not determined. Mycotic diseases may be of only minor importance to veterinary science but until they have been more thoroughly investigated their true status must remain in doubt.

THE FILM IN SCIENTIFIC RESEARCH

The Sciences Committee of the Scientific Film Association is arranging a one-day conference on "The Film in Scientific Research," to be held on October 12th at the Royal Institution, London. The chair will be taken by Mr. J. E. Cummins, chief scientific liaison officer in London of the Australian Government, and the conference will be opened by Sir Robert Watson-Watt. The conference will include discussions by British and foreign men of science on the value of scientific films as a research tool in various branches of science; the function of the research film in giving up-to-date information in a particular field; scientific films as an aid to the training of scientific workers; scientific films as a medium for explaining to the general public important results of scientific research; and technical aspects of the use of films in scientific research. The conference will conclude with a two-hour showing of British and foreign research films. Material suggested for discussion and information as to the existence or availability of research films suitable for showing at the conference should be sent to the Honorary Secretary, Sciences Committee, Scientific Film Association, 34, Soho Square, London, W.1, as soon as possible.—*Nature*.

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A conference of German Hygienists and microbiologists is being held at Stuttgart during August 25th to 27th. Among the topics to be discussed are: tuberculosis in animals and its chemotherapy; immunisation against virus diseases; milk hygiene in Germany; human helminthiasis and its chemotherapy; human and animal trichinosis; rickettsia toxins; morphology and ecology of bacteria; bacteriology of enteritis; serum reactions, etc. Particulars can be obtained from Professor G. Lutz, Heusteigstr. 66, Stuttgart-S.

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The Road Safety Authorities in the South and West have been staging demonstrations on Road Safety at various shows. It was discovered that no reference was being made to consideration for horses on the road, and accordingly Captain F. Beckett, a member of the Council of the British Horse Society, has arranged that at future demonstrations emphasis will be laid by the organisers of the Road Safety Demonstration on the fact that all road-users are asked to give due consideration to horse riders, when passing them on the public highway.—*Horse and Pony News*.

Ley Farming *

I.—By H. I. MOORE, PH.D., M.SC., DIP.AGRIC., N.D.A.

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The importance of farming to-day in the life of the nation needs no emphasis from me. The crisis' years of 1939-45 followed by the equally difficult problem of the food supply in the present reconstruction period can leave no doubt in our minds as to the necessity for a fully productive agriculture. The recognition of this has been made abundantly clear by ministerial pronouncements in recent months.

Now if one glances at the crop acreage for England and Wales one finds the following comparison:—

Tillage	11¼	million acres
Permanent Grass ...	9½	" "
Temporary Grass ...	3	" "
Rough Grazings ...	5½	" "

It is clearly apparent that grass represents the dominant crop (18 : 11¼) and since this crop is utilised solely by livestock it is evident why a successful livestock industry is so vital to the industry and why in turn good grass farming is so essential to the nation. My job lies in the realm of grass production, yours in animal health. The two, therefore, are intimately related and for veterinary practitioners and agriculturists to meet as we are doing to-day to discuss common problems can only result in much good for this great industry of ours.

Far too frequently grass is regarded as a natural covering for the earth—a product of a benign Nature who bestows this precious gift on farmers for their own use. Nothing could be farther from the truth. The natural vegetation of this island is forest, as can be seen readily from the rapidity with which neglected grassland is soon covered with scrub and later trees and low growth. I prefer therefore, to think in terms of uncultivated and cultivated grassland. The former is represented by the moors and fells and hill grazings generally, the latter by permanent and temporary grassland. There is no clear line of demarcation between these types. As age creeps on, the temporary grassland takes on the characteristics of permanent grassland which with neglect soon merges into rough grazings.

Broadly speaking, the uncultivated grassland is represented by the moors of the North and West, the Downs of the South, heaths of the South-East and the uncultivated fens of the East. These are the breeding and rearing grounds for the hardy sheep and cattle which subsequently can be finished under more congenial conditions. One of the most striking differences between the hill grazing and the grasslands of the lowlands is in regard to fencing. The hills are often unfenced or fenced in extremely large units whilst the lowlands are in relatively small units. This is a matter of considerable importance, for with fencing there is a concentration of the influence of the grazing animal which will have a profound effect upon the quality and quantity of herbage produced by those units.

The cultivated grassland is made up of permanent grass and leys. What, you may ask, is the essential difference between these types? The answer lies fundamentally in the botanical make-up of the sward. Permanent grass is likely to contain much more bent, Yorkshire fog and such plants as dandelion, daisy and the like—weed species of low stock-carrying capacity—than the leys which will consist mainly of our first quality species, ryegrass, cocksfoot, timothy and a fair amount of white clover. There is no clear line of demarcation in this case, for leys become colonised by weed species and soon take on the qualities of poorer permanent pasture, whereas, the permanent grass may be so superbly managed that it consists of only the most productive species and retains all the virtues of a young ley, having the same constituents and the same vitality. So in the Welland valley in the Midlands and in parts of Leicester, Northampton and Rutland, one finds some of the finest grassland in the world and which has certainly not been ploughed in living memory. You can tell productive grassland at a glance. There are the right species—the ryegrass, cocksfoot and timothy; there is the white clover and they are in the right proportion: 60 per cent. of grass and 40 per cent. clover. The advantage of the clover lies in its matting effect which helps to keep out weeds and conserves moisture and in the fact that being a leguminous plant, it helps to feed the grasses as well as being a potent source of protein. Too much clover means a less productive pasture—less bulk and a shorter grazing season and the risk of upsetting the animal.

* Papers presented to the Yorkshire Division, N.V.M.A., at York on April 30th, 1948.

Grassland, then, provides the principal source of animal food, being consumed, *in situ*, during spring, summer and autumn, whilst a proportion of the area under grass is used for the provision of hay, silage and dried grass for feeding during the winter. In addition to this, however, grass is regarded as an important means of building up soil fertility although we know that this is so only when the grass is maintained in tip-top condition. It also improves the texture of the soil, improving the tilth of a heavy clay and imparting body to a light sand. The rooting system is very nearly as useful as the herbage itself.

To-day grass is regarded as a crop—as an important source of protein-rich food which in our present straitened financial circumstances it is more economical to produce at home than import as in pre-1939 days in the form of oil-seed cakes and meal. The proper nutrition of the population being of major importance and since a high plane of nutrition calls for an abundance of fresh milk and meat, so does this grass crop require special attention from politicians and practitioners alike.

My task this afternoon is to outline ley farming to you as seen through the eyes of an agriculturist. What do we mean by ley farming? By ley one implies arable land under grass which has been laid down to pasture or for hay for a specific purpose and for a prescribed number of years, after which it will be ploughed up again and cropped according to rotational practice. Sometimes leys are referred to as temporary grass to distinguish them from their more permanent relations and the practice of alternating arable land with a period under grass is known as alternate husbandry or more recently ley farming. As far back as 1649, Blyth pointed out that as continued arable cropping brought evils in its wake so did grass require periodic renewing. Ley farming, therefore, is merely the "new line" of alternate husbandry and both are much too venerable practices for there to be anything very revolutionary in their development.

Why the need for an extension of ley farming as indicated by pronouncements of the Government in recent years? Here are vital points which should convince you of this need in the national interest.

1. Temporary pastures give a much greater output than permanent.
2. Leys are the best agent for cashing-in on accumulated fertility.
3. Grass is much the cheapest source of food for cattle and sheep owing to its much lower cost of production.
4. Leys are much more elastic than permanent grass.

Recent research by Mr. J. R. Currie, the economist for the Dartington Hall Estate, indicates that for the period 1933 to 1945 the relative cost of hand-feeding, both home produced and purchased, compared with grass was 4·3 : 1. This surely points to the need for making more grass on the acres already given over to this crop.

How best shall we procure this—from permanent or from temporary pasture? The analysis of the data on the Dartington Hall farms over the period 1931-41 shows that temporary pastures gave 45 per cent. greater output than that of permanent pasture. And if leys of only three years' duration were considered the margin would be increased to 54 per cent. This supremacy was consistently maintained, as not in one year of the ten did the margin fall below 20 and in the peak year it reached 80 per cent.

You may ask why this supremacy should exist. Pastures are liable to deteriorate due to the invasion of weed species like bent and Yorkshire fog which, compared with ryegrass, cocksfoot and timothy, have a lower yielding capacity and a much shorter season of productivity. Since the best grasses for giving maximum yields of grass are known it stands to reason that breaking up old pastures and renewing them with these grasses is likely to give better results. It is true, of course, that a very small percentage of our permanent pasture—in the Midlands and Romney Marsh for instance—the permanent pastures represent the finest attainable, but one must remember that these are very exceptional cases where the soil is extremely fertile and where the pasture management is truly superb. Stapledon, in his survey of the grassland of England and Wales just prior to the war, showed that no less than 45 per cent. of the grassland was essentially bent pasture representing *4th grade grassland* compared with a fully productive sward. There are, of course, other very considerable advantages attached to leys. With suitable management they can be made to give good grazing earlier in the season than permanent grass and much later in the autumn. The value of the additional keep cannot be over stressed. They are, by and large, more resistant to drought, they are more winter green and they do build up fertility: so much so, in fact, that when ploughed up one has to be very careful to select a stiff-strawed cereal variety or it is likely to lodge and many now prefer to take potatoes or beet as the first crop after ley in order to remove some of the high fertility before risking a cereal.

The very material advantage of the ley must not, however, blind one to some of its more serious limitations. The more open sward is not so resistant to the treading action of hooves and one has to be very careful to avoid poaching, especially on the clays, or irreparable damage may result. Ley farming implies that the whole farm periodically comes under the plough, which means in practice that all fields must be adequately fenced against stock and all should have a satisfactory water supply. Expedients such as electric fences and carting water may be resorted to in the early stages of starting a ley system but eventually the permanent fixtures will be needed.

Then what of animal health? This is where of course your interest quickens and where I must be ultra-cautious, remembering that I am as a babe amongst giants. Here I do openly profess my ignorance and can no more than open up the problem for discussion. In the case of, say, worm infection, as shown by the work at Bangor, leys are cleaner than permanent pastures and therefore cause less trouble. I imagine that the very renewal of the herbage periodically must be very beneficial to animal health. But there remain, of course, some peculiar disturbances. Bloat occupies premier place as ley problem number one in many quarters. You know too well the theories that have been put forward from America and this country in explanation of the cause of bloat. Adrenaline seems, so far as Yorkshire and Northern Ireland results go, to be the answer but not wholly so from the pasture maker's point of view. In some cases feeding hay or straw or controlled grazing may suffice. This gives rise to the question as to whether we are not getting our pastures too pure. There is a school of thought at the present time which is strongly in favour of using mixtures of one grass and one clover. Is this reasonable from the animal standpoint? Should we offer greater variety? We know, for instance, that many of the so-called herbs, ribgrass or plantain, cat's ear, burnet and chicory are highly mineral efficient. Ought we not to offer the animal such plants, *e.g.*, in the form of herb strips? On this point I can assure you that we agriculturists await your verdict with more than passing interest. The answer must lie with you and I do hope in the discussion that those of you with experience on this important problem will not hesitate to give us your views. Some amongst you I know go very much farther than this and even decry these new leys as a possible explanation for a good deal of the infertility found amongst dairy stock. Here again the sooner a solution to the problem is reached the better for the industry and I believe your Secretary had this in mind when asking a mere agriculturist to raise such important issues. Your help in this connection can be of vital consequence to the farming community. Quite apart from the actual grass consumed by the animal there is the conserved grass to consider. Is "herby" hay, by which I mean the hay from a meadow full of rib-grass and other miscellaneous plants, of better value as regards health than that from a ryegrass/clover ley? What are your views on silage? Can you not dispel once and for all the delusion held by so many farmers that silage, because it has an acid reaction, is far from ideal food for stock?

What of the future? I hope that I have made out a good case for an extension of ley farming. Personally I consider that there is a place in our economy for good permanent pasture as there is certainly a place for our hills and rough grazings. I am sure, however, that there is a vast acreage of indifferent grassland in the country—yes, in this country—which in view of our dire need nationally, we should improve as rapidly as possible, *e.g.*, by the technique of ploughing and direct reseeding. Much of this land is well suited for ley farming. Grass is certainly our most vital crop to-day and the one likely to have the greatest dollar-earning capacity. Let us both, therefore, farmers and veterinary surgeons alike, bend ourselves to the task. Much research remains to be done, much experience needs to be ventilated. Grassland husbandry is still in its infancy in this country but, make no mistake, the future of this most versatile of crops is exceedingly promising if our two professions determine unitedly to tackle the problems and make our production and utilisation of grass wholly efficient.

II.—*By* R. H. SMYTHE, M.R.C.V.S.

NOTTINGHAM

I intend to confine my remarks to the veterinary aspect of ley farming and reseeding. For the terms of reference, I can best quote the words of Sir George Stapledon, who in an address to the Central Veterinary Society in March, 1944, laid down four fundamental requirements:—

The *first* that the management of stock appropriate to leys is different from that normally practised on permanent pasture.

The *second* that the soil conditions under leys are, generally speaking, very different from those under permanent pasture. Under the ley there will be no mat and usually the lime status and the phosphate status will have been properly attended to.

The *third* that the species contributing to the ley will be qualitatively and quantitatively different from that under permanent pasture.

The *fourth*, it is implicit in the idea of the ley that it be periodically ploughed up—permanent pasture never. I propose to take these points in order and discuss briefly their particular bearing on disease, infection and resistance. Regarding the management of stock on leys and on permanent pastures, the chief difference lies in the fact that given suitable climatic conditions, cattle may graze on *good* old pastures throughout the whole of the year and when space permits definite areas may be grazed in rotation, whilst others are rested. This also depends upon the state of the fencing and upon the existence or absence of suitable water supply. On leys there are always alternating *on* and *off* periods. The concentration of cattle on leys is almost invariably greater than on permanent pasture for periods varying from a portion of each day to a matter of weeks, depending upon conditions, until the cattle are moved on to a fresh grazing or returned to their stalls. It must not be taken for granted that because cattle are kept on permanent pasture over-crowding will not occur. Old pasture may range over large areas but favourite spots usually exist where cattle congregate and there are also local differences in pasture arrangement. In the Midlands fields are large, frequently with dubious fencing. In the Eastern counties we find large marsh areas and abundance of parasites, grazed mainly by strains of cattle and sheep which have inherited or acquired a degree of immunity. In some counties cattle graze on open downs and there, as in mountainous country also, there may be free range for many miles. When we get down into the south-west, into certain parts of Wales or over into Eire, we find cattle, sheep and horses congregated throughout the year on old pastures, sometimes carrying an average of two head per acre. This seems a fitting point to stress the advantage of variety in the herbage of permanent pasture, ensuring palatability, a feature not always characteristic of leys. Weeds and buttercups, dandelions and thistles may not improve the aesthetic outlook; they may even suggest soil deficiencies, but they certainly vary the monotony of diet and undoubtedly supply essential food elements. In the south-west, the system of substituting banks for hedges affords not only shelter but an additional six feet of herbage around each field carrying coarse foliage, weeds and shrubs. Cattle, when sick, are always to be found feeding from the banks and, among the healthy, there is a constant alternation in feeding from bank and pasture.

The question of soil and subsoil is important from the standpoint of disease, chiefly with regard to the drainage of surface water, the retention of moisture on and beneath foliage and roots and probably but as yet to an unknown extent, the retention, or alternatively, the loss into the subsoil of antibiotic substances produced by soil bacteria which *may* have a limiting effect upon the activities of animal parasites. The importance of stock concentration is largely associated with three diseases—parasitic gastritis, parasitic bronchitis and Johne's disease.

Animal concentration per unit area has a marked effect upon the number of third-stage larvae ingested but other factors may lead to a false estimate if overlooked. The mathematical conception is that the rate of infection increases as the square of the number of animals per unit area. Dr. E. L. Taylor has pointed out that it is the number of larvae per *unit weight of herbage* that really matters and not the square yards of pasture per animal. In actual practice, this varies considerably. Conditions of drought may increase the number of larvae per square yard and, in this way, a considerably greater area is traversed in search of food. Rapidly growing herbage, particularly if it has the chance to grow tall, dilutes the concentration of larvae per stem and also the number ingested, whilst at the same time the resistance of the animal is raised in direct proportion to the adequacy of the daily ration. An ordinary pasture may easily carry from 200 to 500 infective larvae of strongyloid worms per pound of herbage. In time of drought, when the herbage is short and the animals are grazing close to the ground, the number per pound may rapidly rise to 2,000 or more per pound of herbage when grazed by heavily infected stock. A roundworm, such as *Haemonchus contortus*, the most deadly nematode of this type in both cattle and sheep, may lay 5,000 to 10,000 eggs per day in the abomasum and although a large proportion of the resulting larvae may never reach the stomach of another sheep alive, it is significant that a single sheep may harbour as many as 50,000 to 100,000 male and female parasites within its abomasum.

On hill farms, *improved areas* may induce local overcrowding unless the laying out of such areas has been intelligently planned. The habits of sheep have been studied and in general it may be said that sheep concentration per day is in direct proportion to the percentage of clover in the strip. Clover, growing close to the ground, is especially conducive to the existence of infective larvae and is the most dangerous type of foliage. Sheep do the greater part of their defaecating and urinating by night. As a result, the night camp becomes a hotbed of infection. Fortunately, it soon grows a rough tufted and unpalatable herbage which most of the flock ignore—but by no means all. Sheep mainly graze the improved pastures during midday and afternoon and the rougher pastures during early morning and late evening, particularly during and after wet and inclement weather. It is important to improve either a large area of the grazing or none at all for lambs and young sheep, though older animals also may develop clinical or sub-clinical symptoms if the quality of the grazing is too low. Improved areas should seek length rather than breadth so as to afford more frequent and easier access to the rougher grasses and they may well be arranged in the form of a cross in order that sheep may have opportunity to graze in the least exposed positions. Heavy winter losses may be associated with the necessity of finding food in the face of a blizzard. Strongylosis on hill farms before the advent of improved strips was seldom a serious problem. Improvement is apt to increase infection rate, particularly in times of drought. The rotation of species on pasture is important. Old cattle and sheep should follow young, never *vice versa*. Horses, when available, help considerably to clean up ruminant parasites.

Now let us consider Sir John's second requirement concerning conditions beneath ley and old pasture. The absence of mat in the ley (when this has been accomplished) removes the filter pad which normally concentrates the solids with their contained larvae upon the surface. This applies particularly to leys of two years and upwards. The recently upturned sod, although partly cut up by the plough, is for some time resistant to complete disintegration. In the remains of this, the larvae of parasitic bronchitis usually die out. They are not hardy parasites but those of parasitic gastritis are far more active and resistant and they are able to travel up through the sod and regain the surface, from which they again ascend the grass stalks. The sod, still bearing the remains of the mat, whichever way up it now may be, acts as a sponge. It retains moisture and as a result of bacterial contamination, generates heat, thus providing the larvae with an ideal pabulum for their development and protecting them until such time as they may achieve ingestion. Disc ploughing before the final upheaval of the sod helps considerably in disintegrating the old mat and in breaking up the sod, thus lessening the infective capacity of the new ley. The new grass which grows upon the upturned sod carries a smaller number of blades or "tillers" than the grass of the preceding pasture. The result is that the concentration of larvae, principally of parasitic gastritis, is correspondingly higher. A ley covering a light, porous or sandy soil might be expected to provide the minimum conditions for infection if it could be induced to grow a tall foliage such as perennial ryegrass or sainfoin, but in practice such soils do not grow these well. The less contact herbage plants have with the soil the less is the chance of their carrying infection. Humus, which is essential to a continued agriculture, can only be maintained by incorporating the old sod with its stored up nitrogen. Later, in the leys, this is reinforced by the accumulation of animal droppings and by treading, but the older leys are usually fighting a losing battle in this respect and few retain a normal humus content for many years without re-ploughing. I am aware that the advocates of ley farming will dispute this statement.

The third condition insists that the species contributing to the ley shall be qualitatively and quantitatively different from that in permanent pastures. Research has provided us with many new and improved grasses suitable for this purpose. From the viewpoint of combating parasitism, it might be desirable to encourage the breeding of grasses with hairy stems or with a marked corona encircling the junction of stem, leaf sheath and leaf, a formation which helps to deflect the path of the ascending larvae on to the lower surface of the ground leaves. Unfortunately, these characteristics are not always compatible with high quality grasses.

Research might be directed also towards an examination of the water droplets which emerge from the grass stem in contrast with those deposited in the form of dew. This "sweating" of grass materially aids the continued existence of larvae in hot weather. By no great stretch of imagination one may conceive a variation in the composition of the sweat of different grasses with a corresponding variation in its effect upon contiguous larvae. The bacterial flora of the soil also deserves closer study in this connection. The production of antibiotics by soil organisms may possibly influence the survival ratio of parasitic larvae.

The fourth condition, that the ley be periodically ploughed up—the permanent pasture never—may be considered in the light of recent research. From the viewpoint of animal disease, ploughing may appear to possess certain advantages, but the time required after ploughing until the establishment of a permanent ley, represents an economic loss, and re-infestation of the new ley, both from the survival of larvae and from the re-introduction of infected animals, takes a very short time. Whatever its sponsors may have

imagined, ploughing is no safeguard. Although it is known that some infected larvae may survive a whole twelvemonth—as for instance if they become imprisoned in a moist and protected position, such as deep in grass tufts or between leaf blade and shoot—those which have climbed into exposed positions live only for a short period, possibly a week. Resting an old pasture for the period of one month will be sufficient to reduce the number of larvae to normal proportions. Even if it were possible to exterminate the whole of the larvae, the re-introduction of sheep or infected cattle would immediately result in re-infestation. The oxygen requirement of larvae also plays a great part in their struggle for survival. When sheep have free range on a hillside the faeces do not become broken up to any great extent by continuous trampling and a large proportion of the larvae contained within them die from want of oxygen plus desiccation. On the other hand, if the area is overcrowded, as when the sheep are folded, the pellets break up quickly and the larvae are ingested while still viable. If land is rested during hot, sunny weather and well harrowed, the exposed larvae die off in a very few days from exposure to light, the sun's rays and desiccation. The requirements for their survival would be warmth, moisture and shelter from sunlight. Sheep should never be folded on the same patch for more than three days, which is insufficient for the development of third-stage larvae, nor should catch-cropping be practised on land where sheep have grazed six months since, as the new crop will be heavily infected. Aftermath is particularly dangerous from the aspect of parasitic bronchitis. Most of the larvae of stomach worms will have been removed with the hay but the hoose larvae remain close to the ground and infect the second crop as it grows. Old pastures, well eaten down, damped with morning and evening dew, are more deadly as regards hoose than leys.

In all these nematode infections, what really does matter is the ratio between larval infestation and available nourishment. When the food supply is ample even a heavy infestation with parasitic gastritis larvae may come suddenly in animals lacking previous experience of the parasite and possessing a low degree of immunity. In such cases the effect upon the gastric mucosa, with attendant loss of blood from haemorrhages and the suction of worms, may be complicated by widespread toxaemia. The result is catastrophe. But, in the majority of cases, health or disease, recovery or death, is entirely a matter of balance between nourishment and infection. That is the keynote of the disease.

Our next consideration must be Johne's disease. Here, I have no doubt that old pastures, particularly when fields are small and overcrowded, may become heavily infected and will retain that infection for periods of from six to 12 months, perhaps longer. I have experience of two farms which were closed to cattle for one year on account of the disease. They were planted with broccoli and potatoes, then reseeded. They were then stocked with cattle believed free from Johne's disease and the disease reappeared within six months of their introduction. The *p*H of the soil undoubtedly plays a part and acid soils are particularly dangerous. It has been found in Cornwall that when Guernsey cows were raised on a soil, largely composed of blown sand, containing up to 50 per cent. of $CaCO_3$, carrying an open type of herbage, the disease seldom or never assumed clinical severity, although in animals from these farms, *post-mortemed* for other reasons, lesions of the disease could often be demonstrated. When cattle from these areas were transferred to acid soils over-lying granite, they almost invariably developed acute symptoms of the disease and died in too short a time to be capable of explanation by fresh infections. If old pastures are thoroughly chained harrowed until all pads of dung are thoroughly broken up and disseminated and the land is well limed, it will help considerably to reduce the risk of infection, but these operations, to be of use, must always be carried out in dry sunny weather. The land should be rested for as long as possible from cattle but horses may be grazed on the land with advantage.

The other conditions which may be influenced by the type of herbage grown, include those associated with mineral imbalance such as milk fever, hypomagnesaemia and metabolic disturbances, *e.g.*, acetonaemia. I do not propose to deal with the vitamin aspect, other than to say that the concentration of vitamin A or its precursor is directly proportional to the chlorophyll index of the foliage. This corresponds fairly well in new leys at the maximum of their growth and in *good* permanent pastures in springtime, when they have suddenly been activated by rain and sunshine, particularly if they have been manured with farmyard dung. In this respect, the two are fairly equal but, on the whole, both milk fever and hypomagnesaemia occur more readily, throughout the season, on fresh leys. The tendency to the latter condition has been emphasised in fen districts where cattle have grazed on pure Italian ryegrass. Rapidly growing grasses appear to contain, in their juices, certain substances capable of exerting a lactogenic stimulus. When this occurs *suddenly*, there is a corresponding depletion of blood calcium which the mechanism normally regulating the transfer of stored-up calcium is unable to cope with with sufficient rapidity. The reason for outbreaks of hypomagnesaemia on leys is more obscure. The cause may be similar but it has been asserted that lack of available manganese in fresh green herbage may be a factor. The availability of manganese is associated with the *p*H of the soil; it can be lowered by overliming but it is also intimately associated with upsets in the bacterial flora of the soil when brought about by land disturbance and artificial manuring. Both of these may prevent the transformation of insoluble into assimilable compounds by bacterial action. Excess of nitrogen in artificial manures or from other causes, stimulates rapid green growth with increased risk of hypomagnesaemia. In my own experience, accidental flooding of a meadow with liquid sewage resulted in seven sudden deaths from hypomagnesaemia within a fortnight of subsidence. No case of the disease occurred on this farm either before or since this incident. Acetonaemia is a metabolic disturbance associated with the glycogenic function of the liver and is induced by feeding concentrates, but may occur on old worn out pastures when supplemented by hand feeding. Fresh grass from old or new pastures is effective as an antidote.

There are one or two other conditions which I must discuss briefly. The first of these is *infertility*. At one time it was thought that ley farming would provide the answer to this problem. So far, this hope has not been justified. Certainly, in the case of heifers in a state of anoestrus, spring grass is the remedy, but in the case of older lactating animals fresh grass may be a disadvantage. The greater proportion of infertility in this country, apart from infections such as trichomonas and Bang's bacillus, are physiological and are dependent upon abnormal demand upon an abnormal animal. Conditions of diet and of environment which tend to emphasise this already insupportable drain, cannot be expected to provide the remedy. Also, there are undoubtedly basic deficiencies in new leys which do not satisfy the requirements of the animal. It is probable that rapidly grown grasses contain oestrogenic substances in their juices which, although they stimulate oestrus, are capable also of upsetting the hormone balance, particularly the complicated oestrogenic and lactogenic balance of the anterior pituitary. The so-called "bloat" has been recognised for many years, long before ley farming was dreamed of. It has always been common in the south-west, particularly in areas where Dutch clover grows. There are probably two types of "bloat." One of these occurs suddenly, even within a few minutes or an hour of commencing feeding. This is anaphylactic in origin and responds almost as rapidly to adrenalin injection, though sometimes not sufficiently quickly. The second type which is less acute is due to fermentation of a stalked food with which the rumen is unable to cope. On *post-mortem* examination, one encounters two types of fermentation of gas which the animal has been unable to regurgitate. In the less acute type, the rumen is distended with a frothy, yeast-like mass, with very little free gas between it and the rumen wall. The probang quickly relieves the gaseous type but the fermenting type can only be relieved, in many cases, by rumenotomy. Feeding hay or straw, before grazing, helps to prevent the condition but is not always to be depended upon. The anaphylaxia probably depends upon the absorption of a foreign protein. It is interesting to note that a similar tympany may occur from the squashing of warbles, as when an animal in oestrus has been riding other animals in late spring or early summer, or it may occur after the injection of certain biological products. It has occasionally been noted after uterine irrigation.

In concluding this paper, I must confess to an almost Victorian affection for *good* old pastures. There are fields which I consider it would be a sin to break and even more which I would deem it a sin to leave unbroken. A tremendous lot can be done to improve the right type of permanent pasture and in many cases it is well worth the trouble. The chief fault of these permanent pastures has always been that they have proved sufficiently self-sufficient to encourage laziness. Had the same degree of energy been devoted to scratching their surfaces, liming and harrowing them as has been expended in converting them into leys, their worth might have been better appreciated. I am convinced that they are far more satisfactory for rearing young stock than are first and second year leys. There are several reasons for this, including in leys dietary deficiencies, excess of fluid content, rapid passage through the intestine and last, but not least, a frequent unpalatability.

One last word. Our country was fed in the last war, if not actually saved, by the stored-up reserves contained in our permanent pastures. Some day war may again be upon us. Will our leys see us through, or are we cashing in too soon?

Discussion

Major C. York, M.P., in opening the discussion, observed that he would like to say that if he was convinced of the value of ley farming it was due to Mr. Smythe's contribution. However, he had objections to leys, which were summarised under the headings:—(1) They fail to grow young stock. (2) They grow too fast. (3) They suffer from a lack of weeds. (4) He doubted whether ley farming was a sound economic proposition on heavy land. He would also appreciate more information on the cleaning effect on leys on such diseases as tuberculosis and mastitis.

Mr. P. L. Shanks believed that bloat was on the increase with the spread of ley farming. He wished to refer to a particular West Riding farm which was derelict in 1935 and which was rescued to carry a herd of Ayrshires by 1941. When the new leys were at their best in 1942 the first case of bloat occurred and from then until now very serious outbreaks had occurred. The worst instance was during one tuberculin test when, instead of being turned out at 7 a.m., the cows were kept in until 11 a.m. and supplied with oatstraw and hay. When allowed out there were 17 cases of bloat within an hour, but no deaths occurred. The fields are stocked very heavily for three days and then rested for three weeks, all the year round. The disease was found mainly in July, August and September and was most likely to occur when the pasture was wet from rain or dew and when the clover content was especially high (*e.g.*, 80 per cent). The farmer blamed the reseeding but the management must be involved. Feeding coarse fodder before going out had been of some assistance but it was still necessary to watch the cows for the first hour. After that time cases were less likely to develop. In N. Ireland the intra-uterine injection of Trichomonads had resulted in bloat when the second injection was given 12 days after the first. This time interval suggested anaphylaxis, and adrenaline was found to be of value. That the distention was true bloat was shown by surgically demonstrating that the gas was in the rumen. Adrenaline had been used on this farm and had been shown to have a curative value if it was given in time. However, when the cattle were outside, cases of bloat had arisen and no treatment had been possible because they had not been detected in time. The suggestion had been made that there was a protein in young clover or grass which caused sensitisation. The Jealott's Hill Research Association was interested and an attempt was being made to examine the immature proteins in young grasses. The same suggestion had been put forward in America, namely, that anaphylaxis was responsible for *some* forms of bloat. Incidentally milk fever on that particular farm was rare. New leys were important in providing increased food, which raised natural resistance so that loss of life or condition from parasitism was curtailed.

Mr. A. S. Harris said he would like to raise the point that the percentage of infertility had increased on down country but not to the same extent in the dales. The factor of brucellosis, however, must be considered as well as the leys.

Mr. J. A. Lindsay: His experience in N. Staffordshire was that people working with leys did not blame them for disease. He wondered if Mr. Smythe had confused ley farming with direct reseeding. Bloat was an important condition in the Welland Valley and on some bad farms even four-year-old bullocks had suffered sudden death. One farmer was almost unable to graze cattle on his rye and clover mixture. Straw was provided in the fields and on days when bloat was liable the cattle ate a good deal. As the season went on less straw was eaten, for the grass was less succulent. In drought conditions the hungry cattle ate practically no straw, but as soon as rain caused a flush of grass the straw was consumed. He therefore advocated putting straw out in the fields. He wondered if acetonaemia had a closer connection with a high plane of nutrition than with poor pasture. In the west a controlled grazing system was used so that after an hour morning and afternoon on good pasture the cattle were put on to a bare field. This had a good effect on the incidence of the disease but some bloat still occurred.

Dr. Davies: As a New Zealander he was very interested in the discussion because bloat was an important problem in his country. It occurred both on new leys and old permanent pasture, without rhyme or reason. There was a greater tendency for its development on wet mornings and with a high clover content. Their experience was that stock would not take hay or straw when they were out on the lush growth of spring. He suggested that the period cows were away from grass was important, for when they were turned out hungry the quickness of eating was liable to induce bloat. It was for this reason that milking herds were divided into two and milked separately, so that they were not away from pasture for more than one hour. Rationed grazing, using an electric fence for alternate good and bare pastures reduced the incidence of bloat. Rotational grazing was difficult with the size of fields, lack of fencing, etc., but should be attempted. Trials had been carried out by the Animal Husbandry Unit of New Zealand, using twin calves, one set being grazed on set stocking and the other on rotational grazing. At two years of age there was a 70 lb. difference in live weight in favour of those on rotational grazing and the worm burden was higher in calves on set stocking. It was considered that lambs or calves required more mature herbage than the milking animal.

Mr. Adams suggested that old pastures had many of the points of leys plus a little something, although they suffered from the problem of parasitism. He did not have much trouble with bloat in his practice. This last winter he had seen many impactions in housed stock fed on clover hay, which condition he considered was due to the fibrous stalks. This was not seen when old meadow hay was used. He pointed out that on the small farm there was not the land available for rotational grazing.

The Replies

Dr. Moore: Major York had raised some knotty problems. He thought that young stock required a more mature grazing and that the age both of the herbage and of the ley was important. It was the practice of Yorkshire ley farmers to put their youngsters on the oldest ley. The fact that the ley grew too fast was both a virtue and a drawback, but the weight of opinion was in favour when the electric fence was used and the mowing machine, so that silage could be made. There was no concrete evidence to judge against the lack of weeds. Daisies, buttercups and plantains were not in the best interest of the farmer, because they occupied much space. He suggested the herbs should be restricted to a strip and the cattle watched to see how much attention they paid to the strip. The economics of ley farming of heavy land had not been worked out and there was no evidence available. He pointed out that wrong conclusions were liable to be drawn from observations made on ley farming and much organised research was necessary.

Mr. Smythe questioned the statement that leys would not grow young stock, and claimed that some farmers said they were suitable if properly managed. He thought that leys in the first two years suffered from mineral deficiency and were not suitable for the purpose. Maybe the new succulent grass did not stay long enough in the animal for absorption because of its high water content causing scouring. He reminded the meeting that phenothiazine in small daily doses prevented the laying of fertile worm eggs. The drug in salt licks was unreliable because of the difficulty of regulating the doses. These measures, however, could be used to control parasitism on permanent pastures. With regard to mastitis and tuberculosis he thought that ley farming had little effect. He wondered if bloat was actually on the increase and mentioned that in Cornwall the cattle were liable to stop and eat the Dutch clover growing on the roadside, and consequently quickly developed bloat: boys were therefore employed to keep the cattle moving. *Post-mortem* examination of cases of bloat showed that there were two types, one the pure development of gas in the rumen and the other the development of a yeast-like froth which could not be removed by probang or cannula. While bloat and milk fever were not always associated on the same pastures, there might be an analogy and in the case of nettlerash in humans, calcium was prescribed. Infertility might be caused in heavy milking old cows through a shortage of nutritional factors on old leys, which caused hormone imbalance. Acetonaemia was a disease associated with feeding concentrates and common in Channel Island herds when housed. Cutting grass to give to the cow was beneficial: it was a disease seldom seen in cows outside.

BRITISH STANDARDS INSTITUTION

Lord McGowan, speaking as President of the British Standards Institution at its annual meeting, referred to the growing size and influence of the Institution and to the fact that more and more industries were becoming aware not only of the need for standards but also of the advantages to themselves in co-operating with the Institution in the preparation of standards on a national scale. Standardisation as a means of measuring the properties, or assessing the value, of goods was an important element in the proper conduct of industrial and commercial affairs and in the protection of the health and safety of the public; it was important also as a means of establishing satisfactory ranges of types and sizes and where necessary securing interchangeability. Nearly 20 years ago the chemical industry decided to invite the B.S.I. to extend its activities beyond the engineering work in which it had been engaged; events had shown the wisdom of this, as much of the work done by other industries had turned out to be of importance to the chemical industry, and conversely, the work under the Chemical Divisional Council of the Institution has proved to be of significance to many other branches of commerce.

CLINICAL COMMUNICATION

Hypoderma bovis Lesions in Equines

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The harmful effects of warbles on the hides of cattle are well known, but other losses caused through *Hypoderma bovis* have not been given the publicity they merit. *Hypoderma* anaphylaxis in cattle was referred to by Captain Barker in a talk he gave to the Welsh Branch at Aberystwyth a few years ago, and veterinary surgeons working at central abattoirs are familiar with the cow or heifer sent in with a report that the animal is mad. Such cattle are often dangerous, and will attack a human being on sight. A curious fact to note about them is that there is seldom any brain lesion discoverable at a *post-mortem* examination. The only abnormal condition visible is an excessive warble infestation, in which the subcutaneous tissues along the animal's back are converted into a gelatinous blood-tinged exudate. The massive warble infection present always strikes one as being enough to drive any animal crazy.

A search of veterinary literature for information about *Hypoderma* lesions in horses reveals an amazing shortage of material. This year enquiries reveal that there has been a somewhat heavier attack on horses than is usually the case. The comparatively lower commercial value of the humble farm horse, and lack of detailed attention, may be the cause of so few of these animals being reported as having "warbles." This is especially so if the lesion does not appear in a situation which would interfere with harnessing and work. That is probably why it is that hunters, riding ponies and racehorses are the types of animal for which veterinary treatment against the warble fly has been called for during the spring of this year in particular.

As far as can be ascertained, warbles in horses have been more numerous and troublesome than for some years past. Generally, the lesions are not so numerous on a horse as they tend to be on cows. Often it is an isolated warble that appears—usually on the horse's back, but some freak sites are occasionally encountered, such as on the head and legs. Swellings appear, as in cattle, and a small hole is found on the summit. Attempts by grooms to express the grub prematurely may lead to the oedematous swellings associated with the crushing of the warble *in situ*.

The derris wash treatment applied to cattle would appear to be advisable for horses also. During the steeplechasing season this year, interference with training and racing through warbles has been serious. Our tendency to regard *Hypoderma bovis* as confining its activities to cattle only will have to be modified. In this respect one is glad to note that Dr. Lapage, Parasitologist to the Cambridge Institute of Animal Pathology, at the Field Laboratories, is collecting information about warbles in equines. Dr. Lapage would welcome notes on such cases, stating the site, degree of disability, and size of the larvae. It would be especially interesting to know whether any larvae approaching the size of mature cattle warbles have been seen this year, or in past years. Dr. Lapage would be glad to assist in the identification of any larvae found in horses, and although it may be late for this season, perhaps veterinarians who are interested will bear this in mind.

ABSTRACT

[**Independent Variation of Characteristics in *Brucella abortus* Variants and their Detection.** Braun, W., & Bonestell, A. E. (1947.) *Amer. J. vet. Res.* **8**. 386-390.]

It is well known that *Brucella abortus* dissociates its various colonial types when cultivated in the laboratory. It has also been found that the addition of acriflavine to suspensions causes "rough" but not "smooth" strains to agglutinate. Various gradations of this reaction can be recognised and the authors point out that the occurrence of variants which differ in colony morphology but show identical acriflavine reactions amply demonstrates the existence of independent variation of characteristics during dissociation in *Br. abortus*. This evidence furnishes additional support for the interpretation of dissociation in terms of spontaneous, undirected appearance of variants (mutation) and their subsequent establishment under selection pressure.

J. F.

REPORT

[**New South Wales Department of Agriculture, Division of Animal Industry.** Livestock Diseases Report—1946-47.]

The report mentions that there was a slight improvement in the staff position during the year, but that the work of the Division will be limited until a greater number of graduates can be secured.

The campaign against the cattle tick received special attention during the year, though in some areas the eradication measures had to be postponed owing to shortage of labour and fencing materials.

Close liaison was maintained with the Council for Scientific and Industrial Research and the Queensland Department of Agriculture and Stock in relation to the experimental work being carried out by them. In conjunction they were investigating the value of DDT and gammexane (benzene hexachloride or "BHC" or "666") against cattle tick and buffalo fly. The value of both medicaments under certain circumstances has been amply demonstrated but it is agreed by all concerned that further information is required on a number of different aspects of their use, and the work is being continued. Before either drug can be used in an eradication campaign much more information would be required, while, naturally, the cost of using either preparation would be considerably in advance of the cost of using arsenic preparations.

During the year the administrative control of the Cattle Slaughtering, Diseased Animals and Meat Act was transferred to this Department from the Board of Health. This important forward step should result in the greater correlation of *post-mortem* findings on slaughter with field disease control.

Disease Control and Administration

Pleuro-pneumonia contagiosa.—There were only six outbreaks of pleuro-pneumonia contagiosa during the period under review, compared to 22 during the previous period. Five of these outbreaks were in the southern district and one in the Singleton District. In all, 48 cattle died or were destroyed, and 361 were inoculated. The complement fixation test was used widely and 1,905 tests were carried out and 44 positive reactors removed. In each case the outbreaks were traced to Queensland cattle which had been in this State for some months.

Brucellosis-Bovine.—During the period under review 11,448 calves on 1,750 properties were vaccinated with strain 19 vaccine. This procedure is increasing in popularity and it is anticipated that there will be much greater use made of it in future years.

Anthrax.—There were 18 outbreaks of anthrax during the year and all were within the recognised anthrax belt. Deaths from the disease were 701 sheep, 18 cattle and 47 pigs.

Tuberculosis.—In all, 40,527 head of cattle were tested and there were 706 reactors. This number was made up as follows:—

	Tested	*Reactors*	
Tubercle-free Raw Milk Scheme for Sydney, Newcastle and Wollongong:	24,525	281	1·1%
Tubercle-free Herd Scheme	4,409	49	1·1%
Protected Areas	1,561	8	0·5%
Miscellaneous Tuberculin Testing	7,215	641	8·9%

Avian Tuberculosis.—Following the detection of this disease in the Lower Clarence District of the North Coast, a survey of the incidence of the condition in that area was carried out. This revealed that the disease was not widespread there and appropriate control measures were taken. It is also intended to undertake a survey in the Riverina District when the staff position is more satisfactory.

Johne's Disease.—No further cases of this disease were detected. Follow-up work and testing necessitated by the 1946 outbreak was completed.

Stickfast Flea.—The value of DDT against this widespread parasite has been established, and information on this point disseminated to stock-owners.

Contagious Pustular Dermatitis.—Difficulties were encountered on a number of occasions through the refusal of shearers to shear affected sheep. Frequently Departmental Officers were called in for advice. Now that a satisfactory vaccine is available, graziers may be in a better position in future to prevent such difficulties. Arrangements are in hand with the Commonwealth Serum Laboratories to undertake the manufacture of the vaccine, but in the meantime the Veterinary Research Station at Glenfield is supplying the material through the Departmental Field Officers.

Omphalitis is regarded as one of the most serious diseases of chickens, and research into it is being carried out following the repeated requests of poultry farmers' organisations.

Cattle Tick and Tick Fever.—Five outbreaks of tick fever occurred during the period, and though these represent an increase of two over the previous year, it is still very low. Eight cattle only died from the disease and two others which reacted to the test were destroyed.

The following statistical information gives some idea of the extent of the operations of the staff in the tick areas:—

	No. Examined	*No. Sprayed*	*No. Dipped*
Cattle ...	2,645,992	163,973	2,648,484
Horses ...	17,337	7,361	16,214
Sheep ...	2	—	2
Goats ...	1	—	1
Elephants ...	6	6	—
Donkeys ...	2	2	—
Mules ...	4	4	—

Medicament manufactured: 8,395 gallons
Samples dip fluid analysed: 13,110
Samples viscera analysed: 63

Glenfield Veterinary Research Station

The erection of the Nutritional Laboratory at the Research Station will make possible the extension of research projects into the various feeding problems of stock.

During the period under review advantage was taken of the existing facilities at the Seven Hills Poultry Experiment Farm to investigate the dietetic requirements of poultry and the following contributions to our knowledge were made:

It was proved—

1. That low hatchability of eggs from fowls fed a restricted diet due to the shortage of mill offals was caused by riboflavin deficiency. It was shown that this deficiency could readily be met by the feeding of riboflavin-rich feed supplements, such as dried buttermilk.
2. That the keeping quality of eggs is not influenced by a high percentage of meatmeal in the diet.
3. That the system of feeding is not important providing the diet is adequate.

Progeny testing of the White Leghorn stock and of roosters raised from eggs imported from U.S.A. is being carried out.

The other major research projects in hand during the period were:

1. *Toxaemic Jaundice Research* (in conjunction with the Council for Scientific and Industrial Research).—Studies are in progress concerning the absorption of copper from the soil by plants and the assimilation of copper by the sheep. It has been ascertained that the disease is more widespread in New South Wales than was previously believed and, due to the losses of crossbred ewes, the fat lamb production may be seriously hampered.
2. *Bovine Mastitis—Treatment and Control.*—This work was concerned mainly with the treatment of affected quarters by udder infusions with penicillin. In the case of streptococcal mastitis over 70 per cent. cures were effected.
3. *Brucellosis of Cattle—Strain 19 Vaccination.*—While encouraging the use of strain 19 vaccination the Department has continued to make observations regarding the value of this vaccine and the behaviour of non-vaccinated controls.

Weekly Wisdom

"The tradition of modern thought presents philosophy as asking at the outset of its task three vital questions: What can we know? What ought we to do? What may we hope? The second of these is recognised as the fundamental problem of ethics. . . .

"What ought we to do? is harder to answer than What can we know? As for knowledge, its object confronts it, is fixed, immovable, existent in itself. Thought can fall back upon experience. What does not tally with the data of experience is false. But what we ought to do is not yet done, is unreal, without previous existence in itself. It can first attain existence, through the doing. Yet the enquiry is concerning the 'what' of this doing, in order thereby to direct the doing. . . ."—Hartmann's *Ethics*, Vol. 1, pp. 27 and 32. (1930: London, Geo. Allen & Unwin.)

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Sir Frank Stockdale, chairman of the Colonial Development Corporation, has been appointed chairman of the governing body of the Imperial College of Tropical Agriculture, in succession to Sir Eric Macfadyen, who has been associated with the College since 1928.

REVIEW

[**Veterinary Education.** By Professor W. I. B. Beveridge. Cambridge University Press. Price 1s. 6d.]

This inaugural lecture delivered recently at Cambridge gives a useful survey of the past and present development of veterinary education. Beginning with the apt statement "The basic discoveries, such as which of the wild animals are most amenable to domestication, how best to adapt each for work and the development of various products for food and clothing, played an even more important part in the development of civilisation than did the discovery of the steam engine or the internal combustion engine," Professor Beveridge goes on to trace this historical development. The low status of the veterinarian in Western Europe until the end of the nineteenth century is ascribed, at least by implication, to the Christian Church at first and latterly to the participation of misguided medical men in veterinary education.

The historical section is followed by a chapter on the present position. In this the outlines of veterinary education are indicated and their possible adaptation to fit them more specifically into the scheme of things at Cambridge. This is developed more completely in the final section. It is indicated that veterinary students at Cambridge will enter the University having taken the "1st M.B." examination previously and they will then spend six years at the University. The first three years will give the student the opportunity to obtain a broad and fundamental training in the natural sciences in the Tripos. Three subsequent years would be given up to vocational studies which will require the formation of a new department of veterinary medicine in the University. Professor Beveridge states that "the proposed Cambridge School should concentrate especially on training for research." The term research is not confined to laboratory investigations but refers to clinical and field research sometimes carried out by the private practitioner. "The vocational subjects need to be taught by men with the research outlook and enthusiasm—who look upon and therefore teach their subjects as living and growing branches of knowledge." "If it is necessary to sacrifice some detailed information in order to develop a taste for science then the sacrifice is worth while, for once the appetite is created the student will continue to teach himself independently of the teacher." These quotations illustrate the probable lines of development of the Cambridge veterinary school. As regards the research to be undertaken there, Professor Beveridge states "There is unlimited scope in practically every subject for fundamental research appropriate to a university department, leaving applied research to existing veterinary research institutes. Finally it is suggested that the main theme of research to be undertaken should be connected with "the biochemistry of host parasite relationships." The lecture concludes with some useful hints upon the general principles and conditions governing research.

A good and stimulating lecture.

HAEMOPHILIA IN DOGS

In its issue of July 17th, *Nature* notes that F. B. Hutt, C. G. Rickard and R. A. Field (*J. Hered.* **39**. 3; 1948) have described the discovery of a sex-linked haemophilia in dogs. "This shows as a lameness and by swellings in various parts of the body when the puppy is six weeks old. Examination showed that the lameness was due to haemorrhage at the joints. Of 17 puppies which have been recognised as haemophilics, not one has been raised to maturity. Several tests for haemophilia in man were applied to these dogs and were found to give positive results. The breeding histories of the parents of the puppies were known; as a result, it was easily seen that the condition was due to a sex-linked recessive gene called *h*. The importance of the discovery lies in the fact that the comparative physiology of dog and man is well known, and the condition will be of value in research. It is noteworthy that this case in dogs is one of the few sex-linked genes in mammals other than man where seven or eight sex-linked characters are known. The pig has an inherited haemophilia; but this is controlled by a recessive gene on an autosome. It is probable that paralytic or lame puppies which were destroyed in the past were in reality sometimes haemophilic. It would be desirable to discover whether any haemophilic puppies survive to maturity; on the different genetic backgrounds of different breeds, the recessive gene may not always have a lethal effect."

Questions and Answers

The submission of questions for inclusion in this column will be welcomed: they can relate to any aspect of veterinary work. For purposes of record, each question is numbered, and those submitting questions are required to furnish (not for publication) name and address.

Answers to readers' queries represent exclusively the personal opinions of the writers, and criticism of the replies will be appreciated.

All communications should be addressed to the Editor.

Use of M. & B. Soluble in Foul-in-the-Foot in Cattle

Q. CCLIV.—*Is it effective to dose with M. & B. 693 powder in cases of foul-in-the-foot in cattle and if not, why not? Also, why is it recommended, when treating this condition, to repeat the injection in ten days? I have always understood that M. & B. 693 is rapidly excreted, and that the object when dosing with the drug is to keep a high concentration in the blood which will then be able to diffuse into the tissues and kill the infection.*

A.—In foul-in-the-foot in cattle the object of the original work in America was to determine not only the most effective therapeutic agent, but one which would provide maximum response from minimum treatment.

From published reports it is clear that *B. necrophorus* is markedly sensitive to high and immediate concentrations of some of the more active sulphonamide compounds. In single massive dosage by intravenous injection the best results have been gained from the sodium salt of sulphapyridine. The findings of Forman and his American colleagues have been amply confirmed in Great Britain.

Doubtless the same condition would yield to oral treatment by the parent substance sulphapyridine, but slower absorption from the intestinal tract would demand treatment over a period of days to build up and maintain in the bloodstream an adequate concentration of the drug. There are obvious advantages, economic and otherwise, in obtaining a prompt response, and consequently the parenteral route has been adopted.

The percentage of success obtained from a single intravenous injection of the sodium salt in the form of a 12 per cent. solution is remarkably high, and dosage is calculated on the basis of 6 grammes of the drug for each 100 lb. body weight. In certain resistant cases it may be necessary to repeat treatment, and this should be carried out after an interval of not more than four or five days.

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Persistent Diarrhoea in Cows

Q. CCLV.—*I have recently come across several cases of persistent diarrhoea, principally in Jersey cows. Repeated microscopic examination fails to reveal either Johne's bacilli or coccidia, or parasite lesions. These cases retain their appetite to the last but have all eventually been slaughtered when they failed to respond to any form of therapy.* Post-mortem *findings were completely negative. I should be grateful if you could suggest the aetiology of this condition.*

A.—The information given in the question lacks the detail required to enable a satisfactory reply to be made. It is assumed that the cases are occurring in different herds of milking cows with no common dietetic factor operating and that the condition is of a chronic type.

The sparse details given indicate Johne's disease. In the respondent's experience the negative results from repeated microscopic examinations, even when conducted by the laboratory, are not unusual and cannot therefore be accepted at their face value. The absence of macroscopic *post-mortem* findings in the slaughtered animals indicates the need for laboratory examination of suitable portions of the alimentary tract with special reference to Johne's disease.

The history of appetite plus persistent diarrhoea fits in with Johne's disease and with no other form of scour with which the writer is acquainted.

Parasitism and coccidiosis have been negatived and would be unlikely causes in adult stock. *Vibrio jejuni* infection (so-called black scour) which was extremely prevalent in this area in the winter months, is a herd infection which responds readily to housing, dry food and treatment within a few days and which is ushered in by severe loss of appetite and milk (incidentally copper sulphate in medicinal doses appears to be a specific and to have some prophylactic action in herd outbreaks).

It is assumed that dietetic scour associated with overfeeding of succulent foods has been eliminated as a probable cause. Enterotoxaemia—associated with grazing leys or reseeded pastures—can have fatal consequences in individual animals, but loss of appetite is always manifest together with symptoms of intoxication and recumbency in the latter stages of this somewhat acute condition.

Diseases Associated with Leys and Re-seeded Pastures

Q. CCLVI.—*What diseases are particularly associated with leys and re-seeded pastures and what management would you recommend in relation to such disorders?*

A.—A full reply to this question would occupy a complete issue of *The Veterinary Record*. The matter was fully discussed at a recent meeting of the Yorkshire Division and a report of the proceedings is published elsewhere in this issue. Briefly, the disorders particularly associated with leys and re-seeded pastures are: (1) parasitic diseases, particularly parasitic bronchitis and parasitic gastritis; (2) "bloat"; (3) hypocalcaemia and hypomagnesaemia; (4) certain metabolic disorders; (5) lack of growth and development in young cattle and (6) infertility.

Parasitic diseases may manifest themselves clinically when cattle are overcrowded as upon leys. A good deal depends upon the degree of infection present in the animals at the time they are first turned out, also upon the history and previous occupancy of the pastures. Young animals should not follow old. Weather conditions, moisture or drought, sunlight or shade, all play a part in determining the chances of survival of the infective larvae. Control consists in the rotation of animals (horses are particularly useful in removing the parasites of ruminants), resting or ploughing infected areas and the avoidance of overcrowding. Clinical disease depends largely upon the balance between infection and nutrition.

"Bloat" appears to be met with very commonly on leys and reseeded pastures, especially when clovers predominate. It is probable that two causes actuate: (1) Anaphylaxis, arising from the ingestion of certain foreign proteins. Tympany occurs rapidly, often within an hour of commencing grazing. (2) Tympany arising from the presence in the rumen of masses of retained indigestible fibre (stalk) or green leaf with a high water content.

In the first case the tympany arises from the presence of gas only; in the second, it arises from the formation of a frothy yeast-like mass which fails to pass through a cannula and can often only be overcome by rumenotomy. In the anaphylactic type death may occur rapidly unless the gas is quickly removed by probang or trochar. Injection of adrenalin is often effective in cases where time permits of its safe use. It is advised that hay or straw be fed to cattle, shortly before turning out.

Hypocalcaemia and *Hypomagnesaemia*.—Either may appear when milking cows are subjected to sudden flushing by lactogenic substances present in fresh grass.

Growth in young cattle is often backward on new leys of only one or two years' duration.

Infertility.—It is now generally believed that certain substances are lacking in new pastures which are essential to the maintenance of fertility. Whilst fresh grass probably contains oestrogens, valuable in overcoming anoestrus, particularly in backward heifers, it is also possible that it lacks other food elements essential to the viability of the fertilised ovum.

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Correspondence

A Uterine Catheter Difficulty

Sir,—The following information may be useful to the writer of Q. CCXLIX, "A uterine catheter difficulty." In cases where it is impossible to get the catheter into the uterus, he should use an ordinary teat syphon or milking tube: he should have no difficulty in finding a milking tube which fits a Higginson syringe. Another method is to fit a length of rubber tubing to a quart soda water syphon. By means of a Reid's pump the required amount of iodine solution is forced into the syphon. Follow with about ten pumpfuls of air, depressing the lever at each pumpful to allow the air to enter. Remove the pump and fit the milking tube. Place the syphon in the left pocket of an overall, and with the right hand insert the tube in the cervical canal and press the lever. With a rope tied round a cow's body, just in front of the udder, and fixed to a suitable object, the writer has done scores of cases without assistance.

A word of caution is necessary, however, in regard to operating the soda water syphon with iodine solution under air pressure. When the lever is pressed the syphon should be removed from the overall pocket in order to see when the syphon is empty, and also, that no air is forced into the uterus. If a little should accidentally enter the uterus it does not appear to do any harm.

Yours faithfully,

Nantypobtu, J. McIlwaine.
Maesllyn,
Llandyssul, Cards.
August 2nd, 1948.

. . . . .

Sir,—Obstruction is usually due to the last mucous fold which tends to sag, but with a little patience it is possible to pass it. If the cervix is well retracted, there should be little difficulty in

sliding the catheter in—it must never be *forced*. If the condition is purely one of cervicitis, there is, in the absence of a definite endometritis, no point in attempting to pass the catheter. Treatment must be topical. Later, when the animal is in oestrus, if the cervix does not appear patent, carry out dilatation with Albrechsten's instrument, and proceed with service, or artificial insemination. As a rule when an animal is in oestrus, the parts are more relaxed and little difficulty should be experienced in passing the catheter, but only pass it when there is an endometritis present.

Treatment of Colic

The advice given by the late Caulton Reeks is as sound to-day as when it was first tendered, and could with advantage be extended to other conditions which, like this one, are merely symptoms, and which are grouped rather loosely under one heading, which conveys nothing and means very little! In all probability the greatest advance made in the treatment of equine colic was the introduction of the stomach tube, followed by the gradual discarding of the violent purgatives so beloved by our forebears. Pilocarpine is probably the safest drug to employ, hypodermically, but caution is necessary with the mare in advanced pregnancy. For some years I have relied upon chlorodyne, either alone or in conjunction with full doses of spts. aether nit. B.P. Where impaction is present, but colic not severe, I still like to get a full dose of aloes administered *early* in the condition. For general purposes in these cases I prefer liquid paraffin B.P., giving it in quart doses every four hours, up to a maximum of a gallon in an intractable case, in an adult animal. When it was possible to obtain, a single intravenous injection of 20 c.c. of a 25 per cent. solution of Novalgin (Bayer) in uncomplicated cases of the spasmodic type was all that was necessary.

Yours faithfully,

J. F. D. Tutt.

"Rothiemurchus,"
St. Cross, Winchester.
August 21st, 1948.

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Transport of Dangerous Bulls

Sir,—We were interested in your reply to the enquiry on this subject which appeared in the "Questions and Answers" column of last week's *Record*. The difficulty encountered by your enquirer is a very definite one in country practice and we feel your reply was hardly helpful.

On several occasions we have had to combat the difficulty. Our practice has been to withhold drinking water from the animal for a period of 36 to 48 hours and then offer it about three gallons of water containing chloral hydrate. The bulls in question have weighed from 15 to 18 cwt, and 3 oz. of chloral hydrate has been used. The bulls have drunk the whole or the greater part of the water. After about 20 minutes the bull's central nervous system has been sufficiently depressed for it to be an easy matter to lead it from its loose-box into a transport wagon. No food fasting has been adopted. There has been no excitement and no significant locomotor inco-ordination. In our cases the journey from the farm to the abattoir has occupied about half an hour. The drug has "held" the bull throughout the journey and during unloading and subsequent slaughter. No complaints have been received from the meat inspectors of tainting of the flesh.

Yours faithfully,

J. G. Wright,
G. H. Arthur.

The University of Liverpool,
School of Veterinary Science,
Field Station,
"Leahurst," Neston, Wirral.

August 12th, 1948.

DEATH OF DR. CASSIUS WAY

The considerable number of members of the profession in this country who knew Dr. Cassius Way and held him in high esteem will grieve to learn of his death at his home, 13, Littlejohn Place, White Plains, a few hours after being kicked by a racehorse he was treating at Roosevelt Raceway, Westbury, L.I.

Dr. Cassius Way, who was 65 years of age, was widely known as a veterinarian and authority on racehorses and prize cattle. Shortly after obtaining his veterinarian's degree from Cornell University in 1907, Dr. Way became a milk sanitarian for the Borden Company. He entered private practice in New York in 1914 and became internationally known in the veterinary field, being President for some years of the American Veterinary Medical Association.

NOTES AND NEWS

Diary of Events

Sept. 8th to 15th (inclusive).—N.V.M.A. Congress at Southport.

Sept. 11th.—13th Annual Meeting and Dinner of the Royal (Dick) Veterinary College, Alumnus Association at Southport (Prince of Wales Hotel), 7.30 p.m.

Sept. 23rd.—Special General Meeting of the South-Eastern Division, N.V.M.A., at Maidstone (Royal Star Hotel), 6 p.m.

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N.V.M.A. Congress Ticket Applications

Members who have not yet done so are requested *as a matter of urgency* to send in their applications at once for tickets for the Congress functions, excursions, etc., in which they wish to participate.

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N.V.M.A. Handbook, 1948

The Congress Handbook and four of the five papers are now being despatched to members. The remaining paper will be circulated with next week's issue of the *Record*. Any member who does not receive his set by August 28th should advise the General Secretary, N.V.M.A.

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PERSONAL

Dr. J. T. Edwards Honoured.—On August 10th, at the Royal Egyptian Embassy, Dr. J. T. Edwards was formally invested Commander of the Nile by his Excellency the Ambassador at the gracious order of His Majesty King Farouk.

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Birth.—Baird.—On August 15th, 1948, at a nursing home in Brighton, to Betty, wife of Peter Baird, M.R.C.V.S., a son, Peter Benjamin, a brother for Billy and Jimmie.

Marriage.—Forster—McWilliam.—At Alloway Church, Ayr, on August 10th, 1948, by the Rev. A. Tarbett, M.A., B.D., John Forster, M.R.C.V.S., youngest son of Mr. and Mrs. John Forster, Mains of Larg, New Luce, to Mary Elizabeth, only daughter of Mr. and Mrs. Alex McWilliams, Colfin, Stranraer.

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R.C.V.S. OBITUARY

Keir, David, M.C., Capt. R.A.V.C. (T.F.) (retd.), eldest son of the late Mr. and Mrs. Andrew Keir, of Potterhill, Paisley. Graduated Glasgow, July 21st, 1912. Died at a Paisley hospital, August 9th, 1948.

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ROYAL SOCIETY OF MEDICINE

At the annual general meeting of the Royal Society of Medicine, Mr. W. A. Pool, M.R.C.V.S., was re-elected Senior Honorary Secretary for 1948-49.

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UNIVERSITY OF LONDON EXAMINATIONS IN VETERINARY SCIENCE

Following is the Pass List of the University of London Examinations in Veterinary Science, July, 1948:—

First Examination

For external students: Roddis, Alan Frederick, of the University of Liverpool.

For internal students: The following student has completed External First Veterinary Science: Payne, Jack Marsh (Royal Veterinary College).

The following Higher School candidates have completed exemption from the First Veterinary Science: Laing, William I'Anson Peter; Shipley, William; Wilkinson, John Sydney, and Wood, Keith Halsted Benjamin, all of the Royal Veterinary College.

SECOND EXAMINATION: Beckett, Richard Longhurst; Goodwin, Reginald Frederick William; Hall, Leslie Wilfrid (Royal Veterinary College); Hosie, Kenneth Forbes * (University of Glasgow and Veterinary College & Royal Technical College, Glasgow); Jones, David Gwynfor Harries; Kirkby, William Weldon and Wadsworth, Frank (Royal Veterinary College).

* External student.

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Newcastle Disease in Great Britain

EXISTENCE OF A "LOW" FORM

The Ministry of Agriculture and Fisheries has issued the following statement:—

Fowl pest (Newcastle Disease) was introduced into this country in the early part of 1947 by the importation of frozen poultry carcases from Europe. Steps have been taken by slaughter and control of movement to get rid of infection and, in the case of poultry from Europe, by restricting importation to eviscerated carcases to reduce the introduction of further infection to a minimum. On the whole the results have been satisfactory. As, however, outbreaks are still occurring in widely separated districts, there can be no doubt but that there are still centres of unreported disease in this country.

There are at least two forms of Newcastle disease. One, the European form, is more virulent than the form now prevalent in the U.S.A. Until recently there was no reason to think that a low form of the disease existed in this country, but, as a result of the testing of some birds that had been entered in certain laying trials, it has been proved that a low form of Newcastle disease exists here. In dealing with outbreaks of the more virulent (European) form of fowl pest it is the normal practice of the Ministry of Agriculture to make extensive enquiries with a view to determining the origin of infection and also to ascertain how far the infection may have been spread.

In connection with one outbreak, these enquiries led to the examination of certain birds at some laying trials, although the birds at those trials had not had, so far as is known, any actual contact with diseased stock. The health records and egg production of the birds at the trials were found to be satisfactory, but on making blood tests it became evident that some of the birds were or had been affected with Newcastle disease. Subsequent retests of the birds at the trials showed that none of those that had reacted at the time of the first tests had communicated any reaction to the birds with which they were in contact. This seems to suggest that the reacting birds had recovered from the disease when they entered the trials and had not been responsible for transmitting infection to other poultry.

In consequence of what was discovered as a result of the testing of birds at the laying trials the Ministry undertook the testing of birds on the home premises of a number of poultry-keepers who had sent birds to the trials. These tests revealed that there were reacting birds on the home premises also. Further tests have revealed reacting birds on some large hatcheries and in the case of one hatchery it was discovered that nearly three years ago some trouble had been experienced in young chicks (two to four weeks old), but that the only symptoms that those chicks had displayed were similar to those normally associated with slight colds. There was no unusual mortality among such chicks.

The low form of Newcastle disease existing in this country is similar to that which has been recognised for many years in U.S.A., though, if anything, it is of an even less virulent nature, since in U.S.A. the disease has been responsible for a serious decline in egg production, while in this country nothing of that kind has been discovered.

Owing to the wide distribution of birds from hatcheries and rearers over a period of years, the dispersal of birds that would react to blood tests as a result of this low form of Newcastle disease must have been extensive. There is no information to show what proportion of reactors carry this low form of infection nor what is the likelihood of the infection assuming a more virulent character, but since this low form of the disease has existed, in all probability, in this country for three years and, so far as is known, there is nothing to suggest that prior to the importation of the more virulent (European) form it has ever assumed a virulent character here, the experience in this country seems to be somewhat reassuring on this point.

Though there is no data on which a positive statement could be made that this low form of disease exists in many districts, the Ministry can only conclude that it must be present on many premises. The blood testing for determining whether or not birds are or have been affected by Newcastle disease is a delicate one, occupying much time and calling for the services of highly trained staff; its application on a wide scale in the field would, therefore, be impracticable. For these reasons and because it could not be diagnosed clinically—frequently birds affected with this low form show no signs of disease or ill-health—it is clearly impossible to deal with this form of the disease by the slaughter method. That method is suitable and is being pursued against the more virulent (European) form of the disease. Should, however, this low form of Newcastle disease assume a form which could be recognised clinically it would be dealt with on the same lines as those followed in the case of the European form.

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ADDRESSES OF DISEASE-INFECTED PREMISES

The list given below indicates, first, the county in which are situated the premises on which disease has been confirmed, followed by the postal address and date of outbreak.

SHEEP SCAB:

Brecon.—Tynffrwd, Cwm Forest, Talgarth, Brecon (Aug. 10th); Llwyncelyn Farm, Grwynefawr, Crickhowell, Breconshire (Aug. 11th).

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COLONIAL ECONOMIC DEVELOPMENT

In its publication *Commonwealth Survey*, the Colonial Office intimates that to maintain the closest touch between the Colonial Office and Colonial Governments on all aspects of economic development, the Colonial Office has begun to appoint Development Liaison Officers for each of the major Colonial regions. The note proceeds: "The appointment of these officers will go far to meet a recommendation made by the Select Committee on Estimates which reported on Colonial development this year (see *Fifth Report from the Select Committee on Estimates* 1947-48. *Colonial Development, H.M.S.O.* 181). The Committee considered that there had been no system for determining the total needs of the Colonies and making an appropriate allocation of resources, and that, since the economies of the United Kingdom and of the Colonies are complementary, there should be provision for mutual long-term planning. To this end the Committee recommended that schemes of colonial development requiring scarce capital goods should be framed in consultation with a planning authority in the United Kingdom.

CO-ORDINATION IN THE COLONIAL OFFICE

"The post-war economic difficulties of the United Kingdom and of the countries of Western Europe have given impetus to plans for the development of the resources of Colonial territories for their own benefit and for that of the rest of the world. Simultaneously with the strengthening of colonial economies important quantities can be supplied of many commodities which the world needs. In 1947-48 the economic situation in the United Kingdom resulted in a broader approach to the whole question of Colonial economic development which had long been receiving special attention from the Colonial Office. In the past year much progress has been made: many of the schemes in the Ten-Year Development Plans of the Colonies have been put into operation; under schemes administered centrally and financed from Colonial Development and Welfare funds great expanses of territory have been surveyed; the Overseas Resources Act has been passed, and missions have gone out to the Colonies to make on-the-spot investigations into the possibilities of increasing rice, ground-nuts, coal and phosphates production.

"In the United Kingdom this emphasis on economic development has involved very considerable expansion and reorganisation of the economic planning machinery in the Colonial Office. Fullest consideration has to be given to balancing properly social and economic development, while at the same time examining development plans in the light of the United Kingdom's economic position and policy. These functions are largely the responsibility of the Economic Division of the Colonial Office which is composed of seven Departments covering broadly the following economic activities:—

1. Commercial relations; the international aspects of Colonial primary products, in particular, rubber, tin and sugar; communications; and measures for saving dollar expenditure in Colonial territories.
2. Production and marketing questions, relations with the Colonial Development Corporation; and Research.
3. Finance and administration of the Colonial Development and Welfare Act; Economic Intelligence and Planning; and Supplies.

"These three aspects of economic activities are covered by three Assistant Under-Secretaries of State responsible to a Deputy Under-Secretary who is in charge of the Economic Division. Measures for procuring essential supplies for Colonial territories are one of the responsibilities of the Commercial Relations and Supplies Department of the Division, while contact with United Kingdom economic planning organisations is maintained by the Economic Intelligence and Planning Department, which also keeps in view the implications in the Colonies of the United Kingdom's general economic policy.

"The Secretary of State's Advisers, particularly the Advisers on Agriculture, Animal Health, Co-operation, Labour, Education, Fisheries, Forestry, Geological Surveys and Inland Transport, work closely with the Division. The Colonial Economic and Development Council, which advises on the framing and subsequent review of Colonial economic and social plans, and policy, also assists the Division. Similarly, help is gained from the various Colonial Advisory Committees, such as the Advisory Committee on Co-operation, the Committee for Colonial Agricultural, Animal Health and Forestry Research, and the Colonial Research Council.

"In this way integration of colonial social and economic development already exists in respect of the territories themselves and their needs, the needs of the world, and the United Kingdom's policy and resources. The appointment of regional Development Liaison Officers will further strengthen the existing co-ordination and ensure that the Colonies' requirements are met as fully and speedily as possible."

Development Corporation's Plans

The Colonial Development Corporation announced on August 7th, that the instrument through which it will supervise its activities in the various groups of colonial territories will be regional boards of directors, including persons with special knowledge and experience. Arrangements are now being made to establish five such regional subsidiary companies to cover the main groups of colonies. These will be established in the West Indies, West Africa, Central Africa, East Africa and the Far East.

The subsidiaries will be companies with a nominal capital of £100 each, owned by the Corporation. Each of them will have large financial resources in the form of loans from the Corporation, and the Corporation will also provide directly the capital for specific projects.

The subsidiary companies will be able to carry out any of the Corporation's functions within their areas and will act generally as the Corporation's agents, particularly in the investigation of projects and the management of undertakings. They will have a reasonable measure of independence in day-to-day matters under the general supervision of the Corporation. Technical advice and certain common services, including the recruitment of technical and senior members of staffs, will be undertaken in London.

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FENLAND "DUST BOWL" FEARED

The Times reports that at a recent meeting of the West Suffolk County Council it was stated that continual deep ploughing in Mildenhall Fen, Suffolk, threatens to turn 7,000 acres into a dust bowl. The construction of wind-breaks has been discussed as a preventive measure. Two thousand acres are owned by the small-holding department of the Council, which is to consult the Ministry of Agriculture on future policy.

Mr. J. G. Taylor told the meeting that with continual deep ploughing the land blows away to adjoining parishes. "If they keep ploughing it," he added, "it will become a dust bowl similar to those in Western Canada and the United States."

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CHILLINGHAM WILD CATTLE

Lord Tankerville, presiding at the annual meeting of the Chillingham Wild Cattle Association at Chillingham Castle, Northumberland, stated that there were eight cows and five bulls in the herd, and no calves had been born since the winter of 1947, when the number was depleted. Agricultural and genetic experts had been consulted. The cattle might some day belong to the nation, if a trust could be formed with adequate funds. (Lord Tankerville has since reported the birth of one calf).

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Veterinary-Colonel Graham Rees-Mogg's "Clifford Chambers Max," winner of the first prize at the Royal Show in 1937 and 1938, has just sired "Clifford Chambers Rose" who in her second lactation has given 3,040 gallons of milk (3·59 butter fat) in 365 days. "Clifford Chambers Max" is the sire of "Clifford Chambers Rainbow," a first prize winner on several occasions this summer.

Cheltenham Borough Council Public Health Committee reports that it has been the practice for the W.M.S.A. to sell diseased carcases for dog food. Instructions have now apparently been received by them for the disposal for this purpose of livers, heads and lungs which have been found to be unfit for human consumption, and it is felt that this practice would increase the danger from parasites such as hydatid cysts. Strong representations are to be made to the Ministry of Food for the cessation of the practice.—*Meat Trades Journal.*

Advertiser's Announcement

Penicillin Veterinary Cerate

A Correction.—We regret that in last week's advertisement of the above product (p. iii) the cost of boxes of 16 tubes (100,000 units per tube) was erroneously printed as 40s. The correct price is 36s.

CORRESPONDENCE

The views expressed in letters addressed to the Editor represent the personal opinions of the writer only and their publication does not imply endorsement by the N.V.M.A.

Correspondents are requested to write as briefly as possible

EFFICACY OF PASTEURISATION

Sir,—I think Mr. Alex. C. Duncan is mistaken in believing that the group of people who object to the pasteurisation of milk do so on the grounds that it does not render the milk bacteriologically safe. Although some opposition is probably determined by economic or political motives, the main scientific objection is that pasteurisation lowers the nutritive value of milk. There is plenty of evidence to show that efficient pasteurisation destroys any tubercle bacilli that the milk may contain. Much of this evidence has been reviewed by Wilson (1942).*

The autoclaving of cultures of tubercle bacilli during the preparation of tuberculin, to which Mr. Duncan refers, is a technical procedure and it would be incorrect to deduce from this that tubercle bacilli possess a high degree of resistance to heat. In fact, they possess much the same degree of susceptibility as other non-sporing bacteria.

There is, of course, a distinct difference between destroying tubercle bacilli in milk during pasteurisation and in equipment used for udder infusion. The latter is often complicated in construction and, consequently, may be difficult to sterilise. If the apparatus used was thoroughly clean, and simple in construction so that one could ensure that all parts of it could be exposed to moist heat at 100° C. for a few minutes, it is difficult to believe that such treatment would not result in the complete destruction of any tubercle bacilli that it may contain.

Yours faithfully,

40, Cholmeley Park, H. Williams Smith.
Highgate, N.6.
August 16th, 1948.

* Wilson, G. S. (1942). *The Pasteurisation of Milk.* London: Ed. Arnold & Co., Ltd.

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DESTRUCTION OF THE TUBERCLE BACILLUS

Sir,—If "despite routine boiling for 30 minutes there is still risk of spreading the disease" (tuberculosis) what precautions, may we ask, are adopted by artificial insemination centres adequately to sterilise their glass catheters? One of the claims made for insemination is that it minimises the risks of infection, yet I have heard of lay inseminators hunting for a clean catheter, finding and using same from a box containing dirty ones.

And do we ourselves take sufficient care, not only with our sterility instruments and teat siphons but with all other instruments? The intra-tracheal injection for husk might be a means of tuberculosis dissemination. It would seen that to have all instruments discardable like the intra-mammary tube of penicillin is the *reductio ad absurdam* ideal.

Yours faithfully,

Westford Farm, R. G. Mares.
Wellington,
Somerset.
August 8th, 1948.

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THE CALF SUBSIDY SCHEME

Sir,—The above scheme comes into operation next month and the local farmers are being appointed the Certifying Officers; the rate of payment is 3s. 6d. per calf. In my opinion this ought to be done by our profession under the administration of the Divisional Veterinary Inspectors.

There will be cases where the subsidy will be more than the calf is worth and calves will be presented which will never reach maturity and so be a loss to the Government.

I beg to recommend that our Council considers the matter and then approaches the Ministry with a view to their taking over the scheme; also, after it has been tried for a year and supposing it is a success and the Government decides to continue with it, then I suggest that all calves examined next year are tuberculin tested before being granted the subsidy. The testing could be done at very little above the present charge of 3s. 6d. per calf.

This testing will clear the country of a certain number of cases of tuberculosis and when the compensation is very little. It will be an incentive to the farmers to rear good calves and also it ought to increase the price of stores because the graziers will know that they have all been tuberculin tested and should be sound cattle.

Yours faithfully,

Eastwick House, G. C. Lancaster.
Evesham, Worcs.
August 15th, 1948.